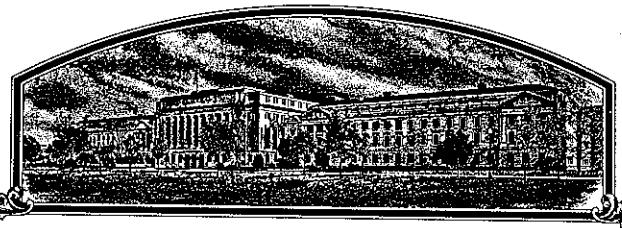
No. 8300077



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Minnesota Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, [THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT TY THEREFROM]* TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS Y THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

[*Waived, except that this waiver shall not apply to breeder seed, foundation seed, labeling requirements, and blending limitations.]

'Marshall' WHEAT

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington this 30th day of August in the year of our Lord one thousand nine hundred and eighty-five.

Attest:

Kenneth A. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

John R. Block
Secretary of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

FORM APPROVED
OMB NO. 40-R3822

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY	1b. VARIETY NAME	FOR OFFICIAL USE ONLY
MN 70170R	Marshall	PV NUMBER 8300077
2. KIND NAME: Hard red spring wheat	3. GENUS AND SPECIES NAME: Triticum aestivum L.	FILING DATE: 3/11/83 — TIME: 11:30 A.M. P.M.
4. FAMILY NAME (BOTANICAL): Graminae	5. DATE OF DETERMINATION: February 15, 1982	FEE RECEIVED: $ 1,000 / $ 500.00 — DATE: 3/11/83 / 7/9/85

6. NAME OF APPLICANT(S)	7. ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)	8. TELEPHONE AREA CODE AND NUMBER
Minnesota Agric. Exp. Stn.	University of Minnesota; 220 Coffey Hall 1420 Eckles Ave., St. Paul, MN 55108	612/373-0751

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (*Corporation, partnership, association, etc.*)	10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION	11. DATE OF INCORPORATION
Agricultural Experiment Station		

12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS:

R.H. Busch, Dept. of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- [X] 13A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
- [X] 13B. Exhibit B, Novelty Statement.
- [X] 13C. Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*
- [X] 13D. Exhibit D, Additional Description of the Variety.

14a. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a). (If "Yes," answer 14B and 14C below.)* [XX] YES [ ] NO

14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? [XX] YES [ ] NO

14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED? [XX] FOUNDATION [XX] REGISTERED [XX] CERTIFIED

15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? [ ] YES [XX] NO *(If "Yes," give name of countries and dates.)*

15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? [ ] YES [XX] NO *(If "Yes," give name of countries and dates.)*

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? [XX] YES [ ] NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

2-7-83
(DATE)

(SIGNATURE OF APPLICANT)

(DATE)

(SIGNATURE OF APPLICANT)

FORM GR-470 (1-78)

8300077

Hard Red Spring Wheat
'Marshall' (CI 17920)

13A. Exhibit A
Pedigree 'Era'/'Waldron'

The cross 'Era'/'Waldron' was made in 1970 under the direction of Dr. R. Heiner. The F_2, F_3 and F_4 were advanced in their respective nurseries under rust (leaf and stem) conditions. Marshall originated from a plant selection from an F_4 line and was increased as a plant row in the Mexico winter nursery (1973-74). This selection designated, MN70170, was tested in a preliminary yield trial as an F_6 line in 1974, in advanced trials in Minnesota from 1975 and in the Uniform Regional Hard Red Spring Wheat Performance Nursery as an F_8 line in 1976 through 1978 (F_{10}). Heterogeneity for resistance to leaf rust was observed among 600 F_{11} head rows grown for purification in the Mexico winter increase (1978-79) and approximately 200 rows exhibiting resistance were selected and bulked. This reselected population was designated MN70170R. Further seed increase was conducted in 1979 at St. Paul, MN and 3,500 plants were randomly sampled from the increase and grown in 1980 as F_{13} plant rows in leaf rust inoculated conditions to verify uniformity. Less than 5% of the rows were moderately susceptible to leaf rust and rougued from the increase. Testing of MN70170 and MN70170R was continued in Minnesota yield trials in 1979. MN70170R was re-entered in the Uniform Regional Hard Red Spring Wheat Performance Nursery in 1980. Marshall has appeared stable and uniform during our seed increase program after reselection.

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Hard Red Spring Wheat
Marshall

13B. Exhibit B -- Novelty Statement (See also EXHIBIT D).

ES 6/23/85

Marshall has both LR2a and LR13 while Era, Solar, and Walera have LR13. LR2a provides seedling resistance to leaf rust races UN1, UN2, UN4, UN10, UN16, and others, while LR13 provides only adult plant resistance to leaf rust. A seedling test for leaf rust using any of the above named leaf rust races distinguishes Marshall from Era, Solar and Walera since it is resistant while they are susceptible. Marshall is also 1 to 2 days earlier to head, is approximately 0.5 percentage points higher in grain protein and is more resistant to lodging (Table 1).

FORM APPROVED: OMB NO. 40-R3822

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Minnesota Agricultural Experiment Station

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
University of Minnesota, 220 Coffey Hall
St. Paul, MN 55108

FOR OFFICIAL USE ONLY

PVPO NUMBER 8300077

VARIETY NAME OR TEMPORARY DESIGNATION
Marshall -- MN 70170R

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:
[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:
[1] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____ [2] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____

[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:
[0][5][8] FIRST FLOWERING [0][6][2] LAST FLOWERING

4. MATURITY (*50% Flowering*):
[0][0] NO. OF DAYS *EARLIER* THAN ..... [3] 1 = ARTHUR 2 = SCOUT 3 = CHRIS
[ ][ ] NO. OF DAYS *LATER* THAN ..... [ ] 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (*From soil level to top of head*):
[0][7][6] CM. HIGH
[ ][ ] CM. TALLER THAN ..... [ ]
[1][8] CM. SHORTER THAN ..... [3] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (*See reverse*):
[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:
[1] 1 = YELLOW 2 = PURPLE

8. STEM:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[1] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT
[0][3] NO. OF NODES (*Originating from node above ground*)
[1] Waxy bloom: 1 = ABSENT 2 = PRESENT
[1] Internodes: 1 = HOLLOW 2 = SOLID
[1][9] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[2] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:
[2] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____
[1] Flag leaf: 1 = NOT TWISTED 2 = TWISTED
[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT
[1] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
[1][1] MM. LEAF WIDTH (*First leaf below flag leaf*)
[3][0] CM. LEAF LENGTH (*First leaf below flag leaf*):

8300077

11. HEAD:

[2] Density: 1 = LAX 2 = DENSE

[2] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) _____

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[2] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[0 7] CM. LENGTH [1 4] MM. WIDTH

12. GLUMES AT MATURITY:

[2] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)

[2] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

[5] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[ ] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[2] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[1] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[5] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[0 5] MM. LENGTH [0 3] MM. WIDTH [3 1] GM. PER 1000 SEEDS

17. SEED CREASE:

[2] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[2] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[2] STEM RUST (Races) 15B2,151,11, 32,56,17,etc

[2] LEAF RUST (Races) LR2A,LR13 Contains genes

[0] STRIPE RUST (Races) _____

[2] LOOSE SMUT

[0] POWDERY MILDEW

[0] BUNT

[2] OTHER (Specify) Ergot

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY

[0] APHID (Bydv.)

[0] GREEN BUG

[0] CEREAL LEAF BEETLE

[ ] OTHER (Specify) _____

HESSIAN FLY RACES: [1] GP [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Era	Seed size	Era
Leaf size	intermed. between Waldron & Era	Seed shape	Era
Leaf color	Era	Coleoptile elongation	Era
Leaf carriage	Somewhat more erect than Era	Seedling pigmentation	Era

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

Hard Red Spring Wheat

13D. Exhibit D. Additional description of 'Marshall'. Marshall is a hard red spring wheat, Triticum aestivum L.

Marshall has LR2A gene from Waldron for additional resistance to a wider spectrum of leaf rust races than the other varieties which are similar in appearance. Also, Marshall is earlier to head and more lodging resistant than Era, Solar, Wared, and Walera. It is usually higher in protein percentage (on an average basis) than Era, Solar, and Walera which most closely resemble it in physical appearance (see Tables 1 and 2 from the 1982 edition of Variety Trials of Farm Crops, Misc. Report 24, Agric. Exp. Sta., Univ. of Minnesota).

E. Area of adaptation and primary use (quality) of the cultivar.

Marshall is suited for production in Minnesota, North Dakota, South Dakota, and Montana. Grain produced in these areas will be used primarily for bread-making.

G. The Minnesota Crop Improvement Association will maintain Breeder and Foundation seed of Marshall. Generations of Marshall permitted in Minnesota are Foundation, Registered, and Certified.

H. The cultivar Marshall will be constituted from breeder seed and processed through Foundation, Registered, and Certified classes in succeeding generations. A cold room supply of breeder's seed is maintained and used if an emergency arises. Foundation seed is produced from Foundation as long as the characteristics satisfy the original breeder's description.

I. No additional restrictions.

Table 1. Characteristics of hard red spring wheat varieties, 1980-82.

Variety	Heading Days from (June 1)	Plant height (inches)	Lodging (score)[1]	Rust reaction[2] leaf	Rust reaction[2] stem	Weight/ 1000 seeds (grams)	Test weight/ bushel (pounds)	Wheat protein (percent)[3]	Milling and baking quality
Butte	21	34	3.8	S	R	33	61.5	14.3	med.-high
Era	27	31	2.6	MR	R	29	60.5	13.2	low-med.
Kitt	27	30	2.5	R	R	32	57.8	14.6	med.-high
Len	25	31	1.9	MR	R	35	60.1	14.8	high-med.
Marshall	25	30	1.6	R	R	31	60.4	13.7	med.-low
Olaf	25	31	2.1	MS	R	35	59.3	14.6	med.-low
Solar	27	31	2.4	MR	R	31	59.8	13.1	low
Wared	28	31	2.2	MR	R	29	59.8	13.6	med.-low
Aim	25	30	2.1	MR	S	25	58.8	13.1	low
Alex	25	37	3.6	R	R	33	61.1	14.9	high-med.
Angus	25	31	2.1	R	R	34	60.2	14.7	med.-high
Centa	19	34	4.2	MS	R	30	61.2	14.5	high-med.
Chris	25	38	5.2	MR	R	29	59.8	15.7	v. high
Coteau	26	36	3.3	R	R	31	59.8	15.9	high
Eureka	23	37	2.6	S	MR	32	59.3	15.1	med.-high
James	20	33	3.0	MS	R	32	59.2	14.5	medium
Oslo	20	30	1.6	MS	MR	32	58.4	13.4	low-med.
PR2360	25	31	2.6	MR	R	29	60.0	13.4	low-med.
Walera	26	31	2.7	MR	R	30	59.3	13.2	low-med.
WS 1809	20	27	2.0	MS	R	28	59.5	14.4	medium
711	24	31	1.9	MS	R	31	60.0	13.3	low-med.

[1] 1 = erect, 9 = flat.

[2] Reaction to prevalent races: R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

[3] 14% moisture basis.

Table 2. Yield of spring wheat varieties in bushels per acre, 1980-82

Variety	Crookston	Stephen	Northern average	St. Paul[1]	Morris	Lamberton[1]	Waseca	Southern average[3]	State average[3]
Butte	50	50	50	54	54	57	52	55	52
Era	53	55	54	51	58	48	48	52	53
Kitt	49	53	51	49	56	45	50	50	51
Len	49	48	49	49	51	50	49	50	49
Marshall	54	54	54	48	55	53	--	52	53
Olaf	46	48	48	49	53	50	49	51	49
Solar	58	57	57	49	59	44	49	50	54
Wared	51	51	51	46	55	42	48	48	49
Aim	47	44	44	47	48	47	47[4]	47	47
Alex	52	51	51	45	55	50	--	50	50
Angus	52	42	42	54	50	45	48	50	48
Centa	48	--	--	50	51	--	--	--	--
Chris	36	37	37	36	49	42	--	42	39
Coteau	43	46	44	41	52	43	--[4]	45	45
Eureka	50	46	48	46	52	51	44[4]	50	49
James	49	49[2]	49	48	51	49	50	50	49[4]
Oslo	52	50[2]	51	53	51	--	--	--	52[4]
PR2360	52	--	--	48	53	--	--	--	
Walera	53	53[4]	53[4]	52	55	--	48[4]	--	52[4]
World Seeds 1809	45	36	41	48	45	44	45	45	43
711	53	48	51	51	53	48	51	51	51
LSD 5%	8	10	6	7	6		5	5	4

[1] 1980 and 1982 data.

[2] 1980-81 data.

[3] Waseca not included.

[4] 1981-82 data adjusted to 3 year average.

8300077

United States Department of Agriculture
Agricultural Marketing Service
Livestock and Seed Division
National Agricultural Library Building
Beltsville, MD. 20705

PLANT VARIETY PROTECTION OFFICE

Gentlemen:

Subject: Application No. 8300077
'Marshall' Wheat

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the Certificate on the above variety be issued with a notation on the Certificate that the right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is waived, except that this waiver shall not apply to breeders seed, foundation seed, labeling requirements, and blending limitations.

It has been agreed that the Certificate should be issued in the name(s) of:

MINNESOTA AGRICULTURAL EXPERIMENT STATION

6/24/85
(Date)

Jay L. Thompson
(Signature)